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Research Aid

USSR: Long-Range Prospects for Hard Currency Trade

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USSR: Long-Range Prospects for Hard Currency Trade[1]

Recent increases in world market prices for oil, gold, and other raw materials have dramatically improved the USSR's export prospects in hard currency countries. The Soviet Union has moved from a balance-of-trade deficit of US \$1.7 billion in 1973 to a surplus of perhaps \$1.0 billion in 1974.

Improved export prospects will greatly enlarge Soviet capacity to import Western machinery and equipment for the balance of the 1970s -- by up to 30% annually in current dollars, perhaps 20%-25% annually in real terms.

The Soviet economy will not be able to assimilate imports at this rate. Thus, Moscow probably will adjust by keeping gold sales below current production, using Western credits only when terms are particularly favorable, and holding back exports of certain raw materials.

In 1981-85 the growth of import capacity probably will tail off to half the previous rate. This will be so even if the USSR has concluded a number of cooperative ventures that contribute to hard currency earnings and is relying heavily on gold sales and Western credits.

1. This report discusses the Soviet balance of payments and the limits to Soviet import capacity during 1975-85. The conclusions were largely arrived at through the use of a gaming model which projects import capacities and balance-of-payments positions, given various combinations of world market conditions and Soviet policy decisions. Soviet hard currency exports (the major source of Soviet hard currency earnings) were forecast separately and were used as an input to the model. The Appendixes provide descriptions of the model and the method used in projecting exports.

DISCUSSION

Introduction

1. In the past dozen years the USSR has been unable to generate sufficient exports to pay for its imports from hard currency countries. To finance its substantial trade deficits, the USSR increased its medium- and long-term indebtedness to the West from $230 million at yearend 1961 to $3.6 billion at yearend 1973.

2. The rapid expansion of the debt raised the question of Soviet ability to continue to increase imports from the West. This question became moot in 1974, however, because the Soviet trade balance is moving solidly into the black as the result of soaring prices for major exports, oil in particular.

Situation Through 1971

3. The Soviet hard currency trade deficit averaged about $250 million annually during 1960-71 (see Table 1). Until the mid-1960s these deficits were financed primarily by gold sales. By the end of 1965, Soviet gold reserves were down to 975 metric tons, compared with 2,300 tons at yearend 1960. After 1965, medium- and long-term credits on purchases of capital goods replaced gold as the chief element in financing Soviet deficits. Gold sales were near rock bottom in 1966-71, and reserves grew to an estimated 1,750 tons by the end of 1971. Medium- and long-term debt to the West, meanwhile, grew to more than $2 billion (see Table 2). By 1971 the debt service ratio – the ratio of principal and interest payments to exports -- had risen to 18% for Soviet hard currency trade.

Developments in 1972-73

4. The poor harvest of 1972 forced the USSR to purchase large quantities of agricultural products to sustain Brezhnev's program for upgrading the Soviet diet. At the same time, the continued lag in industrial modernization strengthened the leadership's determination to upgrade its industrial plant by stepping up imports of advanced equipment and technology. Large imports of grain ($825 million), other agricultural products, and machinery and equipment led to a record trade deficit of $1.4 billion with hard currency countries.

Table 1

USSR: Hard Currency Trade Deficit and Gold Sales

	Million US $				Metric Tons	
	Hard Currency[1]					
	Exports	Imports	Balance	Gold Sales[2]	Gold Sales[2]	Gold Reserves (Yearend)
1960	768	1,018	-250	200	180	2,270
1961	900	1,061	-161	300	270	2,100
1962	951	1,184	-233	220	195	2,000
1963	1,012	1,287	-275	560	500	1,600
1964	1,073	1,556	-483	460	410	1,330
1965	1,374	1,560	-186	560	500	975
1966	1,517	1,755	-238	....	....	1,125
1967	1,711	1,616	95	16	14	1,265
1968	1,909	2,018	-109	12	11	1,415
1969	2,125	2,436	-311	....	....	1,570
1970	2,197	2,711	-514	....	....	1,730
1971	2,652	2,955	-303	....	....	1,895
1972	2,815	4,171	-1,356	300	150	1,950
1973	4,817	6,566	-1,749	1,000	300	1,850

1. Based on official Soviet data.
2. Calculated at the official rate of $35 an ounce for sales in 1960-68 and subsequently at estimated free market prices.

Table 2

USSR: Estimated Drawings and Scheduled Repayments on Medium- and Long-Term Credits

	Million US $				Percent[1]
	Drawings	Scheduled Repayments of Principal and Interest	Net Credits	Outstanding Debt at Yearend	Debt Service Ratio
1966	275	170	105	505	11
1967	305	181	124	658	11
1968	510	255	255	951	13
1969	630	322	308	1,316	15
1970	715	389	326	1,722	18
1971	682	477	205	2,029	18
1972	1,030[2]	573	457	2,608	20
1973	1,690[2]	814	876	3,641	17

1. Scheduled repayments of principal and interest as a percent of hard currency exports.
2. Including drawings on three-year Commodity Credit Corporation credits.

5. In 1973 the hard currency deficit increased still further, to $1.7 billion. Imports jumped to $6.6 billion -- almost $1.5 billion in grain, several hundred million dollars more in other agricultural products such as sugar and butter, and about $1.8 billion in machinery and equipment. In contrast to 1972 -- when exports rose only slightly -- exports in 1973 (as expressed in dollars) rose by 71% because of higher prices for oil and other raw materials.

6. To cover the 1972 deficit, the USSR relied chiefly on credit (see Table 3). Government-backed net medium- and long-term credits amounted to about $500 million, and about $100 million of US Commodity Credit Corporation (CCC) three-year credits were drawn to finance grain purchases from the United States. The USSR also tapped the Eurocurrency market in late 1972 and early

Table 3

USSR: Hard Currency Balance of Payments

Million US $

	1972		1973		1974[1]	
	Credit	Debit	Credit	Debit	Credit	Debit
Current account		1,118		876	1,656	
Merchandise trade[2]	2,815	4,171	4,817	6,566	7,500	6,500
Gold sales	300		1,000		750	
Interest repayments[3]		122		157		220
Other goods and services[4]	130	25	157	78	212	32
Transfer payments[5]		45		49		54
Capital account	567		1,009		542	
Medium- and long-term credits	1,030	451	1,690	657	1,400	858
Compensation payments[6]		12		24		
Basic balance		551	133		2,198	
Errors and omissions[7]	551			133		2,198

1. Preliminary estimates.
2. Derived from Soviet statistics; exports and imports are f.o.b.
3. Interest payments are those made on medium- and long-term credits obtained from Western countries mainly to finance imports of machinery and equipment. Interest payments and receipts on short-term loans are not included.
4. Including profits of Soviet-owned banks and firms in the West and costs and receipts from travel.
5. Payments made in hard currency to the United Nations and UN-affiliated organizations.
6. Soviet payments of principal and interest in accordance with the US lend-lease "pipeline" agreements.
7. Including changes in hard currency holdings, short-term capital movements, and hard currency repayments from less developed countries for Soviet credits.

1973 for several hundred million dollars in both medium- and short-term credits to finance imports of machinery and grain. In addition, the USSR sold gold in substantial quantities for the first time since 1965 (see Table 1).

7. In 1973, Moscow took advantage of high gold prices in financing its hard currency trade deficit. The USSR sold roughly 300 tons, which earned about $950 million. The remaining deficit was more than offset by government-backed Western credits (including almost $400 million in CCC credits) and increased borrowing in the Eurocurrency market.

Performance, 1974

8. In view of the record grain harvest in 1973, Soviet outlays for agricultural products were substantially smaller in 1974 – about half or less of the 1973 outlays. During the first nine months of 1974, for example, Soviet imports of grain from the United States, the USSR's main supplier, amounted to only about $300 million, compared with $840 million imported in 1973. Imports of machinery and equipment, however, climbed again in 1974 as deliveries mounted on the large volume of contracts concluded during the past two years. (The value of contracts increased from about $800 million in 1971 to $1.7 billion in 1972 and $2.6 billion in 1973.) Total imports from hard currency countries approximated $6.5 billion.

9. Soviet exports rose substantially in 1974, chiefly because the price received for Soviet oil more than doubled – from an average of $4.50 in 1973 to $10 or more per barrel in 1974. Moreover, exports of oil may have reached 42 million tons (840,000 b/d) as against 35 million tons (700,000 b/d) in 1973. Oil exports alone earned a total of perhaps $3 billion in 1974.[2] Together with higher prices for other Soviet raw material exports, hard currency exports might have totaled $7.5 billion.

10. In 1974 the USSR's balance of trade therefore may have been in surplus by $500 million to $1 billion, in vivid contrast with the $1.7 billion deficit in 1973 and the practically uninterrupted string of deficits since 1960 (see Table 1). In addition, Moscow has continued to sell gold in response to the high prices prevailing in Western markets, and could have earned $750 million or more from this source by yearend.

11. The Soviets reacted to this turnaround in several ways. Orders placed for Western equipment in the West during 1974 rose sharply after midyear, reaching $4.0 billion by yearend. The Soviets also contracted to buy for cash more than

2. Latest information indicates that 1974 crude oil sales may have fallen short of 42 million tons and that, as a result, total 1974 hard currency exports may fall short of previously estimated levels.

$1 billion in grain and sugar in the last half of 1974. They probably would not have bought such large quantities if -- as in the past -- such purchases required heavy borrowing. Finally, during the first six months of 1974 Moscow reduced its short-term liabilities on the London Eurodollar market by more than $200 million and increased its assets by roughly $100 million. This pattern, if mirrored in the entire Eurocurrency market, could result in a sizable reduction in the USSR's short-term liabilities.

Prospects, 1975-85

12. The USSR will probably continue to earn ample foreign exchange to pay for goods it wants to obtain from the West for at least the next few years. High prices for oil, gas, gold, and other major Soviet exports and a rapid expansion in the volume of Soviet exports of gas, raw materials, and manufactures should lead to a very rapid increase in hard currency earnings. Growth of export earnings will probably slow beginning around 1980, however, as exportable supplies of oil shrink and the expansion of natural gas exports slows. Soviet policy choices will have important effects on actual foreign exchange earnings and hence on the capacity to import. These choices include:

- the terms offered to Western countries on commodity pay-back ventures,
- the choice between sale of gold and its addition to reserves, and
- the extent to which the USSR seeks and uses Western credit.

13. Earnings from exports of goods and services, revenues from gold sales, and credits obtained from the West are the main variables that determine import capacity. A gaming model was used to assess the aggregate effect of these variables on Soviet import capacity in the next six years, 1975-80, and for five years beyond, 1981-85. An explanation of the model is in Appendix A. Soviet hard currency revenues (and import capacity) as estimated for 1975-85 are computed on a current dollar basis -- that is, inflation is built into the major elements of the model.

14. The paragraphs below discuss the variables individually and the combined effect of the variables and policy options on Soviet import capacity.[3] Detailed explanations of supporting estimates are contained in Appendix B.

3. The following discussion assumes a policy of maximizing imports on an annual basis. The feasibility of maintaining various rates of steady import growth throughout 1975-85 was also examined. The results are presented in Appendix C.

Merchandise Exports

15. The Soviet terms of trade have improved steadily since 1969, particularly in 1973-74 when increases in world market prices and Soviet exportable surpluses combined to increase Soviet export earnings dramatically. Price increases are expected to tail off after 1974, but world demand for many of the USSR's major exports – oil, natural gas, coal, timber, and diamonds – should remain strong. The USSR also should be able to rapidly increase the volume of exports of these and other goods. Beyond the 1970s, export growth should decline sharply as the quantity of oil available for export steadily diminishes and deliveries of natural gas to Western Europe level off. The signing of additional commodity pay-back deals (see Table B-2, Appendix B), however, would offset some of the decline. By 1985, for example, the signing of all commodity pay-back deals now being seriously discussed would result in an additional $6 billion in earnings (see Table 4).

Table 4

USSR: Annual Import Capacity Under Best Case - Worst Case Conditions

	Billion Current US $					
	Exports[1]	**Net Invisibles**	**Gold Sales**[2]	**Net Credit Drawings**	**Net Hard Currency Available for Imports**[3]	**Percent Increase**
1975	9.3 to 9.3	0.2	0 to 1.4	-0.2 to 1.4	9.3 to 12.3	53 to 105
1976	10.9 to 10.9	0.3	0 to 1.6	0.3 to 2.4	10.9 to 14.1	17 to 15
1977	12.5 to 12.5	0.3	0 to 1.6	-0.5 to 2.2	12.1 to 16.4	11 to 16
1978	14.6 to 14.6	0.4	0 to 1.7	-0.8 to 2.0	13.9 to 18.3	15 to 12
1979	16.1 to 16.5	0.5	0 to 1.8	-0.9 to 1.9	15.3 to 20.4	10 to 11
1980	17.7 to 18.8	0.5	0 to 1.9	-1.0 to 1.1	16.9 to 22.0	10 to 8
1981	19.0 to 22.0	0.7	0 to 2.0	-0.9 to 0.2	18.4 to 24.6	9 to 12
1982	19.9 to 24.3	0.8	0 to 2.1	-0.8 to 0.8	19.6 to 27.5	7 to 12
1983	21.3 to 26.5	0.9	0 to 2.3	-0.6 to 1.5	21.4 to 30.6	9 to 11
1984	22.8 to 28.4	1.1	0 to 2.4	-0.5 to 2.2	23.0 to 33.5	7 to 9
1985	24.7 to 30.6	1.2	0 to 2.5	-0.4 to 3.4	25.2 to 37.2	10 to 11

1. The low end of the range represents annual import capacity from exports alone, assuming that no additional commodity pay-back deals are signed. The high end of the range includes export earnings which would occur if agreement is reached on the deals now under negotiation–Yakutsk and North Star natural gas, Sakhalin oil, and Kaiser aluminum complex (see Table B-2).
2. At $150 per troy ounce.
3. After allowance for changes in the working cash balance.

16. Over the next six years -- to 1980 – earnings from merchandise exports and invisibles alone might allow Moscow to increase Soviet annual import capacity by an average of 20%; this pattern of growth would support an annual average

of $13.1 billion in imports during 1975-80 (see Figure 1). For 1981-85 the annual rate of import growth sustainable from merchandise exports only (measured from the estimated 1980 level) will drop back, perhaps to 10%; even so, import capacity during this period might rise to $22 billion annually.

Commodity Pay-Back Ventures

17. Aside from earnings derived from exports discussed above, additional revenues may be earned from commodity pay-back ventures. The USSR has already concluded several major deals with Western firms involving Western guarantees to purchase a portion of the output from plant and equipment purchased under the agreement.[4] Additional deals are in the offing (see Table B-2, Appendix B). The deals now under negotiation would have little effect on Soviet net import capacity[5] in 1975-80, but could increase import capacity in 1981-85 by $4 billion annually. Figure 2 illustrates the annual addition to import capacity resulting from commodity pay-back ventures.

Invisibles

18. Foreign exchange earnings from invisibles are led by tourism and transportation. Net earnings from these two sources alone could rise from about $65 million in 1973 to $500 million by 1980 and $1.2 billion in 1985. Net earnings from tourism are expected to be boosted by detente to $450 million by 1980 and $1 billion by 1985. Increased trade contracts will result in greater numbers of Western businessmen visiting the USSR as part of commercial negotiations. A growing number of Western businessmen will also be living in the USSR for long periods as a result of the establishment of commercial offices in Moscow. For a number of years, the transportation sector has been a net earner of hard currency because of the vigorous expansion of the Soviet merchant fleet. Earnings should rise steadily, perhaps to more than $100 million annually by 1980 and $200 million by 1985.

Gold Sales

19. In contrast to the long-term effect of decisions on commodity pay-back ventures, a decision to sell gold would have an immediate impact on import capacity. At the estimated long-run price of $150 per ounce, sales from current production alone could increase the average annual import capacity by about $1.7 billion over the short run and by roughly $2.3 billion during 1981-85.

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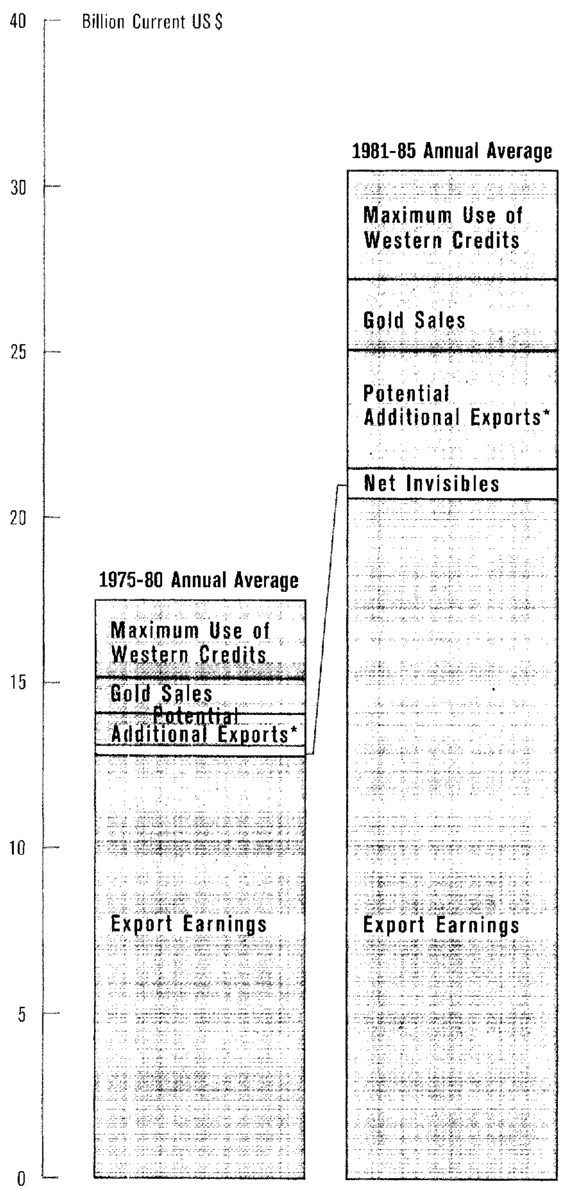
4. Net earnings from the ventures already signed (included under export earnings discussed above) would bring about $3.4 billion in additional import capacity during 1975-80 and $9 billion during 1981-85. Details concerning the value and timing of Soviet imports and exports associated with each deal already concluded are in Table B-3, Appendix B.

5. Excluding imports during 1975-80 required to put the ventures into operation.

FIGURE 1

USSR: Capacity for Hard Currency Imports by Major Options, 1975-85



* From commodity pay-back ventures.

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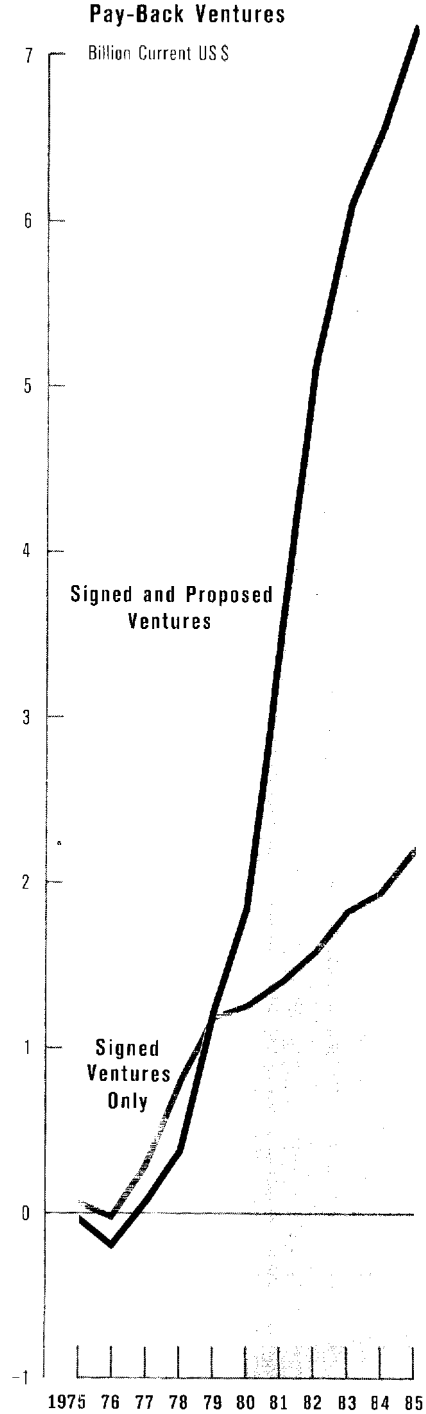
FIGURE 2

USSR: Net Annual Addition to Import Capacity from Commodity Pay-Back Ventures



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Western Credits

20. Western medium- and long-term credits have been an important factor in the growth of Soviet imports from the West. They almost certainly will be less of a factor over the next five to six years, although the USSR will continue to draw on the large volume of Western credit already extended. With export earnings rising rapidly, Moscow will have little need to solicit Western credits in order to increase imports substantially during 1975-80. But as long as Western governments continue to offer long-term credits at interest rates below the expected world long-term inflation rates, Moscow will probably opt for credits, at the same time reducing exports of gold and/or goods whose real worth is expected to increase over time.

21. The USSR could increase its credit drawings considerably, say up to 25% annually throughout the 1975-80 period, without incurring problems in debt management. If the USSR decides not to utilize credits from the West during 1975-80, payments on existing debt would diminish import capacity by a total of $3.9 billion (see Table 5). Alternatively, a 25% annual increase in credit drawings during this same period would result in a $5.4 billion increase (after debt service payments are made) in Soviet import capacity during 1975-80. Such an expansion of credit would add an average of $1.6 billion to annual import capacity (see Table 5). Under an alternative policy, annual long-term credit drawings might remain at the $1.1 billion figure estimated for 1974. This would increase average import capacity only $500 million annually during 1975-80 but would imply a reduction in the debt service ratio to only 10% by 1980.

22. The use of credit in 1981-85 will be determined in part by the size and composition of Soviet debt carrying over from 1980. To compensate in part for an expected decline in the growth of merchandise exports, the Soviets may make extensive use of Western credits in 1981-85. Heavy drawings could increase annual import capacity by $3 billion or more at the expense of greatly increased debt and debt service.

Policy Options

23. In 1975-80 the USSR has a number of options available as the result of the dramatic switch in its payments position. For example, without an undue increase in its debt service, the Soviet Union could sustain an average annual growth of imports in 1975-80 of up to 30% in money terms, perhaps 20%-25% in real terms.[6] Because a major portion of increased imports will consist of sophisticated

6. Recent Soviet contracts placed in the West have been characterized by higher prices and some include price escalation clauses.

Table 5

USSR: Effect of Various Credit Policies on Import Capacity and Debt Management

	Zero Credit Drawdown	Drawdowns Remain at 1974 Levels	Credits at 1974 Levels Through 1980 with a 25% Annual Increase During 1981-85	25% Annual Increase in Credits During 1975-85
	Billion Current US $			
If no additional pay-back deals are signed on credit				
Addition to import capacity				
1975-80	-3,900	-591	-591	5,400
1981-85	-1,890	-3,100	1,084	15,100
Existing debt				
1980	2,000	6,100	6,100	12,900
1985	400	5,028	9,600	34,750
	Percent			
Debt service				
1980	5	10	10	15
1985	1	6	9	29
	Billion Current US $			
If additional pay-back deals are signed on credit				
Addition to import capacity				
1975-80	1,736	5,013	5,013	11,021
1981-85	-7,600	-8,852	-4,701	9,291
Existing debt				
1980	8,500	12,700	12,700	19,400
1985	3,800	8,350	12,900	38,100
	Percent			
Debt service				
1980	8	13	13	18
1985	5	9	11	28

Western equipment, the USSR probably could not assimilate growth of imports at this level. At the same time, past Soviet policy suggests that the augmented import capacity would not be used to support large increases in imports of consumer goods or to build large hard currency cash balances. What is most likely is a combination of substantial increases in imports, a willingness to use credits where terms are favorable, and sales of gold out of current production. The USSR over the last few months has in fact used all of these options.

24. In 1981-85 the USSR would still enjoy a considerable range of choices. It probably would make greater use of Western credits and gold sales to offset the probable decline in the growth of merchandise exports. The mix of policy would be affected by how foresighted Moscow had been in the late 1970s in arranging joint ventures that generated exports in the 1980s and by the size and composition of Soviet debt existing in 1980. Under favorable conditions and with maximum credit use and revenues from gold, the annual average growth of import capacity in 1981-85 probably would not be much more than 15% in money terms, less in real terms. The $31 billion in average annual import capacity in this period may well be adequate to satisfy Soviet needs for Western equipment, technology, and other goods.

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APPENDIX A

USSR: GAMING MODEL TO FORECAST IMPORT CAPACITY

Approach

A gaming model was constructed to derive alternative patterns for the Soviet hard currency balance of payments in 1975-85 under various assumptions. The value of goods and services that the USSR buys from its hard currency trading partners was taken as a function of earnings from exports of goods, services, and gold and from net drawings on Western credits. The model, using projected revenues and alternative Soviet policy options, generated a range of annual import capacities for 1975-85, or, alternatively, examined the feasibility of various targeted growth rates during 1975-85.

Assumptions

The following assumptions were made in calculating Soviet import capacities. The USSR:

- will not hold foreign exchange beyond necessary transactions balances (equal to 15% of imports, lagged one year);
- will not draw on Western credits if the result is a debt service ratio in excess of 40%;
- will trim hard currency imports whenever it experiences three consecutive balance-of-payments deficits in excess of $500 million;
- will be able to sell all the gold it wants to at an average price of $150 per ounce;
- will continue to obtain Western credits at favorable rates – 10% downpayment, 7% interest, and an average credit length of 8 years; and
- will not add substantially to its equity holdings in the West.

Methodology

The following alternative values for key variables were examined in various combinations for 1975-85.

a. The USSR either (1) marketed the total amount of gold produced annually (less domestic consumption), or (2) completely suspended gold sales to the West. It could, of course, sell a smaller amount than annual output or -- less likely -- a larger amount.

b. The USSR either (1) reached agreement with Western firms on the additional commodity pay-back ventures currently under serious negotiation, or (2) decided against all further deals of this nature.

c. The USSR decided either (1) to maximize imports on an annual basis or (2) to follow targeted import growth rates. When steady growth rates were assumed, the following annual rates of increase were examined: 10%, 15%, 20%, and 25%. Balance-of-payments surpluses that occurred in the course of following a fixed rate of growth would be applied to reduce the level of imports financed on credit. Any surpluses that still remained were subsequently applied to increasing imports above planned levels.

d. The USSR adopted alternative policies toward Western credits, as follows:

(1) zero drawdowns throughout the period;

(2) constant annual drawdowns at the expected 1974 level of \$1.1 billion;

(3) drawdowns increasing by 25% annually against the 1974 base;

(4) drawdowns at the expected 1974 level through 1980, and thereafter increasing by 25% annually; and

(5) annual drawdowns as required, when targeted growth is assumed.

Equilibrium Equation

The model is tied to an accounting identity which allocates all identifiable foreign exchange flows for any given year to total earnings, expenses, and changes in working cash balances. The necessary balance between receipts and outlays of foreign exchange is obtained through the use of a residual category.

1. TEARN(I) - TEXP(I) - AWCBAL(I) = RES(I)

Total earnings and expenses are in turn derived from specific forecasts for each of their respective components, whereas working cash balances were judged to be a function of the change in the annual projected levels of Soviet imports.

Soviet Foreign Exchange Earnings

2. TEARN(I) = EXT(I) + SERX(I) + GS(I)

3. EXT(I) = EX1(I) + EX2(I) + EXJV(I)

4. SERX(I) = TRANSX(I) + TRAVX(I) + TRANSFX(I) + TDRAWX(I)

5. TDRAWX(I) = ADRAWX(I) + CDRAWX(I)

Soviet Foreign Exchange Costs

6. TEXP(I) = IMT(I) + SERIM(I) + TDP(I)

7. IMT(I) = AIM(I) + IMJV(I)

8. AIM(I) = IMCR(I) + IMNCR(I)

9. TDP(I) = [ADP(I) x IMCR(I))+(JVDP(I) x IMJV(I)]

10. SERIM(I) = TRAVM(I) + TRANSM(I) - TRANSFM(I) + COMPM(I) + DSER(I)

11. DSER(I) = PIA(I) + PPA(I) + PIJV(I) + PPJV(I)

Working Cash Balances

12. AWCBAL(I) = 0.15 x (IMT(I-1) - IMT(I-2))

Adjustment Process

Two separate adjustment processes are used, depending on whether Moscow follows a policy of import maximization or sets a fixed rate of annual import growth. Since it is assumed that the USSR will not hold excessive foreign exchange in reserve or invest heavily in the West, the adjustment process in each case redistributes any initial surplus in the balance of payments to either increased imports (in the case of import maximization) or to a combination of increased imports and reduced credit drawings (in the case of targeted growth).

Import Maximization

Initially, autonomous imports not backed by Western credits are set at zero, and the residual is determined.

13. IMNCR(I) = Ø

The level of autonomous cash imports is set equal to the original residual and the equilibrium equation is recomputed to determine the new level of imports and residual such that:

14. a. IMNCR(I)' = RES(I) IF RES(I) > Ø

    b. IMNCR(I)' = Ø IF RES(I) ⩽ Ø

15. AIM(I)' = IMNCR(I)' + IMCR(I)

16. TIM(I)' = AIM(I)' + IMJV(I)

17. TEXP(I)' = TIM(I)' + SERIM(I) + TDP(I)

18. TEARN(I) - TEXP(I)' - AWCBAL(I) = RES(I)' ⩽ Ø

Targeted Import Growth

Initially, autonomous imports are fixed in accordance with set growth rates. The level of autonomous imports backed by credit is also set in advance, with autonomous imports purchased for cash judged to be the difference between the two.

19. IMNCR(I) = AIM(I) - IMCR(I)

If the residual is greater than zero, then the residual is redistributed according to the options in effect.

20. DEBRET(I) = PCT x RES(I) IF RES(I) > Ø

21. DEBRET(I) = Ø IF RES (I) ⩽ Ø

Cash imports are adjusted by amount of surplus not allocated to reduction of credit drawings.

22. $IMNCR(I)' = IMNCR(I) + (1\text{-}PCT) \times RES(I)$

If $DEBRET(I) \geqslant IMCR(I)$ then:

23. $IMCR(I)' = \emptyset$

24. $IMNCR(I)' = IMNCR(I)' + [DEBRET(I) - IMCR(I)]$

25. $TDP(I)' = JVDP(I) \times IMJV(I)$

If $DEBRET(I) < IMCR(I)$ then:

26. $IMNCR(I)' = IMNCR(I)'$

27. $IMCR(I)' = IMCR(I) - DEBRET(I)$

28. $TDP(I)' = [ADP(I) \times IMCR(I)' + JVDP(I) + IMJV(I)]$

In either case, equilibrium equations are recomputed to determine the adjusted levels of imports, drawings, and debt such that:

29. $TEARN(I)' - TEXP(I)' - AWCBAL(I)' = RES(I)' \leqslant \emptyset$

Constraints on the Balance of Payments

Following the completion of the adjustment process, the results of each option combination are examined with respect to the following constraints:

Debt service ratio cannot exceed 40%

$$DSR(I) \quad 0.40$$
$$DSR(I) = DSER(I) \div EXT(I)$$

Annual surplus cannot exceed \$500 million

$$RES(I) \quad \$500 \text{ million}$$

Annual deficits cannot exceed \$500 million for any three consecutive years

$$RES[(I)', (I + 1), (I + 2)] \geqslant -\$500 \text{ million}$$

Glossary*

Autonomous	-	portion of imports and exports not associated with self-liquidating joint ventures
(I)	-	the year in question, from 1975 through 1985
(a)'	-	value of (a) after adjustments made for options in effect
ADP	-	percentage downpayment required for autonomous imports financed by long-term Western credits
ADRAWX	-	receipts from long-term credits (including downpayments) advanced in support of autonomous imports
AIM	-	autonomous merchandise imports
AWCBAL	-	annual adjustment to working cash balances, a function of the level of imports
CDRAWX	-	receipts from long-term credits (including downpayments) advanced in support of commodity pay-back joint ventures
COMPM	-	outlays to cover compensation payments
DEBRET	-	amount allocated to debt retirement
DSER	-	outlays to finance the service of their long-term debt
DSR	-	debt service ratio
EX1	-	autonomous merchandise export earnings exclusive of crude oil
EX2	-	earnings from sales of crude oil
EXJV	-	export earnings from commodity pay-back joint ventures
EXT	-	merchandise exports
GS	-	earnings from gold sales

* All items refer to the USSR.

IMCR	-	autonomous imports financed by long-term Western credits
IMJV	-	merchandise imports associated with commodity pay-back joint ventures, all assumed to be covered by long-term credit
IMNCR	-	imports paid for in cash
IMT	-	merchandise imports
JVDP	-	percentage downpayments required for imports associated with commodity pay-back joint ventures which are financed by Western credits
PCT	-	percentage of surplus allocated to debt retirement
PIA	-	annual interest payments on outstanding long-term debt associated with autonomous imports on credit
PPA	-	annual principal payments on outstanding long-term debt associated with autonomous imports on credit
PIJV	-	annual interest payments on outstanding long-term debt associated with self-liquidating joint ventures
PPVJ	-	annual principal payments on outstanding long-term debt associated with self-liquidating joint ventures
RES	-	net accretion or diminution of foreign exchange holdings, exclusive of those required for working balances
RES(I)'	-	residual after adjustments have been made; will have a non-zero value only in instances where original RES(I) was less than zero
SERIM	-	outlays for invisibles
SERX	-	receipts from invisibles
TDP	-	expenditures for downpayments on imports financed by long-term credits
TDRAWX	-	receipts from long-term credits (including downpayments) advanced by the West

TEARN	-	foreign exchange earnings
TEXP	-	foreign exchange outlays
TIM	-	total merchandise imports
TRANSM	-	expenses associated with the transportation of merchandise to and from the West
TRANSFM	-	outlays for transfer payments to the West
TRANSFX	-	receipts from Western transfer payments
TRANSX	-	receipts from transportation earnings
TRAVM	-	expenses for travel in the West
TRAVX	-	receipts from Western tourists

APPENDIX B

USSR: ESTIMATION OF HARD CURRENCY EXPORT EARNINGS, 1975-85

Soviet exports to hard currency countries have been set largely on a quantitative basis as part of the Soviet foreign trade plan. Actual earnings have been dependent on prices obtained, and the physical volume of exports rarely has been adjusted in response to short-term changes in world market prices. When adjustments have been made, they usually have involved changes in existing stocks rather than in production.

Wherever possible, both the volume and price of individual Soviet exports were projected to 1975-85. Where quantity data were not available, future export values were projected from historical trends.

Some projections were made on the basis of estimated production, consumption, and consequent availability for export. Projections of exports associated with commodity pay-back deals were made on the basis of the quantities and prices cited in signed contracts or current negotiations. The following paragraphs discuss, by major commodity group, the methodology and results of the export projections.

Oil and Oil Products

Oil and oil products will continue to be the largest single source of Soviet hard currency revenues (see Table B-1). The future availability of Soviet oil for export to the West will be influenced by several factors, including East European requirements and Soviet imports from the Middle East under barter. The prices received for oil were adjusted to expected rates of world inflation using a 1974 price of $10 per barrel as a benchmark. The expected rapid rise in both prices -- averaging 8% annually in 1975-79 -- and exportable surpluses in the short run should boost earnings from oil to an annual peak of $5.4 billion in 1980. Subsequently, exportable surpluses are expected – despite continued rises in price -- to decline steadily, and earnings from oil will fall to $3.5 billion by 1985.

The USSR is soon expected to sign an agreement with US and Japanese firms for the exploration of oil along the Sakhalin continental shelf (see Table B-2).

Table B-1

USSR: Hard Currency Exports

Million Current US $

		Estimated	Projected		
	1973	1974	1975	1980	1985
Total	**4,817**	**7,500**	**9,300**	**17,700** (2,200)[1]	**24,700** (5,800)
Of which:					
Oil and oil products	1,250	3,050	3,675	5,420 (1,000)	3,468 (3,500)
Natural gas	26	100	250	1,407 (1,000)	1,700 (2,000)
Coal and coke	125	200	250	400	950
Ores and metals	400	550	650	1,600 (100)	2,650 (300)
Wood and wood products	625	1,050	1,525	2,675	5,750
Chemicals	108	135	155	1,375	1,700
Diamonds	450	500	600	1,200	2,400
Platinum	260	350	400	700	975
Machinery and equipment	300	375	475	1,425	2,875

1. Projected additional earnings from the signing of additional commodity pay-back deals.

Table B-2

USSR: Contemplated Joint Ventures with Commodity Pay-Back

Project Title	Western Nation	Estimated Cost of Western Equipment (Million US $)	Year of Initial Purchases	Year of Initial Soviet Exports	Status of Negotiations
Kaiser: aluminum complex	United States	1,400	N.A.	N.A.	Commercial negotiations about to begin
Yakutsk natural gas	United States-Japan	3,000	1975	1981	US Eximbank credits for exploration have not been granted
North Star Project	United States	3,000	1975	1979	Soviets have upped the asking price for natural gas
Sakhalin oil exploration	United States-Japan	1,000	1974	1978-80	USSR, Japan, and United States close to agreement

If the exploration is successful, exports from this source could substantially boost earnings during the 1980s, perhaps by as much as $3.5 billion annually.

Natural Gas

The USSR has signed several commodity pay-back agreements with West European nations calling for Soviet exports of natural gas during 1975-85 and beyond (see Table B-3). Annual Soviet deliveries under these agreements should reach 10 billion cubic meters by 1975 and 22.5 billion cubic meters by 1980. Natural gas prices in Western Europe are linked to oil prices, and the price of Soviet gas was adjusted to oil prices described above.* Annual earnings are expected to rise from $100 million in 1974 to $1.4 billion in 1980. During 1981-85 the quantity of gas delivered under existing contracts probably will not change; price increases are expected to raise annual earnings to $1.7 billion by 1985.

The USSR is also negotiating two major natural gas deals with the West -- Project North Star with the United States and Yakutsk natural gas development with the United States and Japan. If agreements on both are concluded, net earnings from gas sales would soar during the 1980s, when the projects are expected to come on stream, perhaps by as much as $2.0 billion annually by 1985.

Coal and Coke

Past trends and estimates of future Soviet production and demand indicate a 7%-8% annual rise in the quantity of coal available for export. Prices are estimated to rise by about 4% annually throughout 1975-85. As a result, earnings from traditional sources should reach $350 million by 1980 and $600 million by 1985. Moreover, the USSR has recently concluded a commodity pay-back deal with Japan calling for additional Soviet exports of coal beginning in 1979, which will raise annual earnings by $30 million in 1980 and $300 million by 1985. Because higher prices will more than offset lower volume, exports of coke are expected to rise from $18 million to $20 million in the period.

* The Soviets have recently renegotiated natural gas prices with West Germany and Austria. In each case the price of Soviet gas is now linked to fuel oil prices in the West German and Austrian markets, with the price of Soviet gas set at 20%-30% below its caloric equivalent market price.

Table B-3

USSR: Signed Joint Ventures with Commodity Pay-Back

Project Title	Western Nation	Estimated Value of Soviet Imports (Million US $)	Year of Initial Purchases	Year of Initial Soviet Exports	Value of Project-Associated Exports (Million US $)	
					1975-80	1981-85
Natural gas deal	Austria	110	1969	1969	900	1,000
Natural gas deal[1]	West Germany	1,500	1970	1974	2,800	4,700
Natural gas deal	Italy	190	1971	1974	1,200	3,200
Natural gas deal	France	250	1972	1976	700	1,462
East Siberian forestry	Japan	163	1969	1969	Deal completed in 1974	
East Siberian wood chip plant	Japan	45	1972	1972	145	50
Ust Ilimsk timber complex	France	60	1974	1977	34	50
Fertilizer complex at Kuybyshev	United States	400	1975	1978	2,000	2,500
Chemical plants: Montedison	Italy	500	1975	1977	175	250
Siberian coal deposits at Chulman	Japan	450	1975	1989	80	860
Iron-ore pelletization plant at Kursk[2]	West Germany	1,000	1975	N.A.	450	1,000
Second East Siberian forestry development	Japan	550	1975	1975	1,100	....
Chemical plants: Ente Nazionale Idrocarburi	Italy	1,000	1975-1980	N.A.	N.A.	N.A.
Chemical plants: Litwin SA	France	100	1974	1977	50	60
Aluminum complex	France	600-1,000	1976	N.A.	N.A.	N.A.
Chemical plants: Creusot-Loire	France	220	1975	1979	100	225

1. Three separate deals have been concluded—in 1970, 1972, and 1974.
2. Although the Soviet decision to pay cash for purchases makes counterpurchase agreements somewhat unnecessary, West German firms are expected to sign long-term contracts for delivery of products.

Ores and Metals

World prices for many of the ores and metals that the USSR exports in quantity have risen rapidly in 1974 and should continue to rise at lesser rates during 1975-76. Thereafter, annual price increases for most ores and metals are assumed to stabilize at 5% annually in 1977-85. Quantity projections proved difficult in many cases because of the small export bases in earlier years – for example, copper and iron ore -- or because of erratic export performance in the past – steel and pig iron. As a result, projections were often based on judgments by commodity specialists, using past trends in combination with likely world demand and estimated future Soviet production capacities.

Additional exports will be generated by recent Soviet agreements to provide enriched uranium to the West and by exports of iron ore pellets beginning in 1978 stemming from the Soviet-West German agreement to build iron ore processing facilities at Kursk. Earnings from ores and metals as a group should rise from an estimated $550 million in 1974 to $1.6 billion in 1980 and $2.6 billion in 1985.

The Soviets are presently negotiating a major pay-back deal with Kaiser Corporation for the development of the aluminum refining industry. If signed, the deal would generate substantial additional exports during the 1980s.

Wood and Wood Products

Soviet exports of wood and wood products -- primarily saw logs and wood pulp – have risen rapidly during recent years. Moreover, timber prices on world markets have climbed sharply since 1972 – in some cases as much as two and one-half times. The Soviet development of the East Siberian forestry industry should spur continued increases in the quantity exported – perhaps as much as 15% annually for the next decade. World market prices probably will continue to rise, but the rate of increase is expected to decline to 10% by 1975 and to 5% by 1980. As a result, total Soviet earnings from wood and wood products should rise from an estimated $1 billion in 1974 to $2.7 billion in 1980 and $5.8 billion by 1985.

Chemicals and Chemical Products

Soviet exports of chemicals will also benefit from recent and future price increases on world markets. Prices are expected to rise by 15% during 1974; the rate of increase should fall to 5% by 1976 and is assumed to stay at that level for the balance of the period under consideration. Soviet chemical exports will be boosted in the future as a result of the pay-back deals recently signed with Western firms. The Occidental agreement calls for the annual export of roughly $500 million in fertilizers beginning in 1978. Exports from other commodity pay-back deals signed with Italian and French firms will add another $75 million or more annually beginning in the late 1970s when the new facilities reach full production.

Diamonds and Platinum

The USSR has been a major exporter of diamonds in the past decade and has benefited from substantial increases in world diamond prices during recent years. Projected earnings are based on regressions against the values of diamonds exported to the West during 1965-73. The resultant 15% annual growth in exports should be sustainable because of growing demand and increased Soviet production, cutting, and marketing facilities.

Exports of platinum and platinum group metals have climbed steadily and have also benefited from recent increases in world prices. Future exports are projected on the basis of past volume trends, with allowance for expected changes in prices. Projected earnings should reach $700 million by 1980 and upward of $1 billion by 1985. Estimates may be far off the mark, however, if huge amounts of platinum are required by the United States and other nations for use in auto emission control.

Manufactured Goods

Manufactured goods account for a small proportion of total exports. The value of machinery and equipment exports, for example, represented only 6% of total Soviet exports to hard currency countries in 1973. Recently, the USSR has paid increased attention to the establishment of the sales-service and spare parts facilities required to support expanded exports of manufactured goods and has begun efforts to tailor products to Western markets. At best, exports of manufactured goods might rise by as much as 15% annually through 1985.

Other Goods

Lack of appropriate data and/or the minor individual importance of many other commodities precluded specific projections for 25% of exports. These other commodities were taken to increase in value by 9% annually, the annual rate of growth of total Soviet exports in the past.

APPENDIX C

TARGETING A CONSTANT RATE OF GROWTH OF IMPORTS

Soviet planners may not wish to pursue a policy of maximizing annual imports. Instead they may, based upon their expectations of hard currency earnings, establish targets for the rate of growth of imports for the periods under study: 1975-80 and 1981-85. In recognition of this possibility, a second series of options was examined -- testing Soviet ability to meet constant annual growth rates of 10%, 15%, 20%, and 25% under varying conditions.

In following such a policy, Moscow is assumed to borrow only to the extent required to import enough to satisfy the constant rate-of-growth target. The individual credit options serve only as an upper limit to the total amount that could be drawn annually. Since the targeted rates exclude imports associated with commodity pay-back deals, actual imports in any given year could be greater than the targeted levels. In years when earnings exceed the levels required to finance the targeted level of imports on a cash basis, Moscow could also decide to use some of its surplus earnings for above-plan imports. Thus, if the USSR meets the target rate, imports should never fall below planned levels in any year, but may exceed them, particularly during 1975-80.

The rate of growth of imports that could be sustained during 1975-85 depends on the Soviet willingness to (1) sell gold from current production, (2) draw on Western credits, and (3) enter into additional commodity pay-back deals. If Moscow should decide to forgo these options, high balance-of-payments deficits during the 1980s would limit long-run import growth targets to 15%. By drawing heavily on Western credits, particularly during the 1980s, the Soviets could manage a 20% annual growth of imports throughout the 11-year period. The signing of additional pay-back ventures and/or the selling of gold from current production -- by increasing Soviet exports -- would lessen Moscow's dependence on Western credits in achieving a steady 20% annual growth rate (see Table C-1). In all cases examined, however, the ability of the USSR to increase imports steadily at rates in excess of 20% per year was ruled out by balance-of-payments deficits or debt service ratios which in the 1980s exceeded the stipulated limits: i.e., three consecutive years of deficits of $500 million or more or a debt service ratio of more than 40%.*

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* See Appendix A.

The Soviets could also opt to increase imports by 25% annually through 1980 and accept a lower targeted growth thereafter. A 20% annual import growth rate could be maintained during 1981-85, for example, if Moscow decided to sell gold, sign additional ventures, and draw heavily on Western credits (see Table C-2). Drawings on credit without gold sales or additional pay-back deals would result in a maximum growth of imports of less than 15% per year, whereas ***either*** selling gold ***or*** signing additional joint ventures in combination with credit drawings would limit the obtainable growth target to less than 20%.

In fact, the target growth option would yield larger annual import growth in the 1980s than would maximizing imports year by year. But a portion of the difference can be attributed to a difference in underlying assumptions. With annual import maximization, increases in Western credits were limited to 25% per year, while no limits were placed on the credits used in meeting targeted growth levels other than the constraints associated with debt service ratios. If the Soviets limited the increase in Western credits to 25% annually with targeted growth rates, potential growth targets would have to be less than 20% in 1971-85 (compared with a 25% annual growth in 1975-80) to avoid excessive current account deficits.

Table C-1

USSR: Western Credits Required To Support an Import Growth of 20% per Year

	Value of Credits Required (Billion Current US $)		Debt Service Ratio (Percent)	
Options	**1975-80**	**1981-85**	**1980**	**1985**
Gold not sold; no new commodity pay-back deals signed	3.0	64.0	5	31
Gold sold; no new commodity pay-back deals signed	2.9	47.0	5	22
Gold not sold; new commodity pay-back deals signed[1]	10.5	37.2	8	17
Gold sold and new commodity pay-back deals signed[1]	10.5	22.5	8	11

1. The new commodity pay-back deals are listed in Table B-2.

Table C-2

USSR: Western Credits Required to Support an Import Growth of 25% per Year in 1975-80 and Varying Rates Thereafter

Options	Value of Credits Required (Billion Current US $)		Debt Service Ratio (Percent)	
	1975-80	1981-85	1980	1985
Gold not sold; no new commodity pay-back deals signed				
15% growth, 1981-85		Excessive debt service by 1985		
20% growth, 1981-85		Excessive debt service by 1984		
Gold sold; no new commodity pay-back deals signed				
15% growth, 1981-85	4	56	5	30
20% growth, 1981-85		Excessive debt service by 1985		
Gold not sold; new commodity pay-back deals signed[1]				
15% growth, 1981-85	16	51	10	25
20% growth, 1981-85		Excessive debt service by 1985		
Gold sold; new commodity pay-back deals signed[1]				
15% growth, 1981-85	11	29	8	16
20% growth, 1981-85	11	72	9	33

1. The new commodity pay-back deals are listed in Table B-2.